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(56) Documents Cited:
GB 2436687 A **GB 2432405 A**
EP 0218409 A2 **CH 000641885 A5**
US 7150476 B2 **US 5694972 A**
US 5105844 A **US 3162211 A**
US 0105818 A

(58) Field of Search:
INT CL **F16K, F16L, F24D**
Other: **Online: WPI, EPODOC**

(54) Title of the Invention: **An aftermarket fluid release valve**
Abstract Title: **Bleed valve**

(57) A bleed valve for a domestic radiator comprises a plug 1 having an aperture 9, a puncture mechanism, and an attachment means such as a screw thread to connect the valve to the radiator such that inward entrance or progression of the plug towards the radiator is enabled, and outward progression inhibited. A release screw 5 allows bleeding of fluid from the radiator.

FIGURE 1

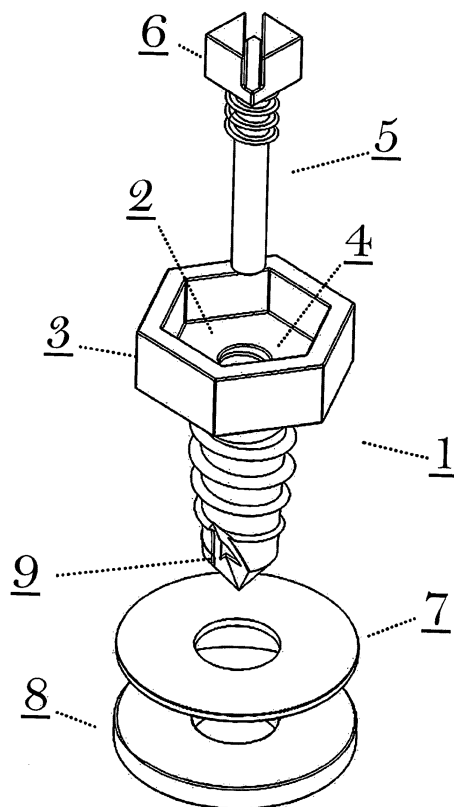


FIGURE 1

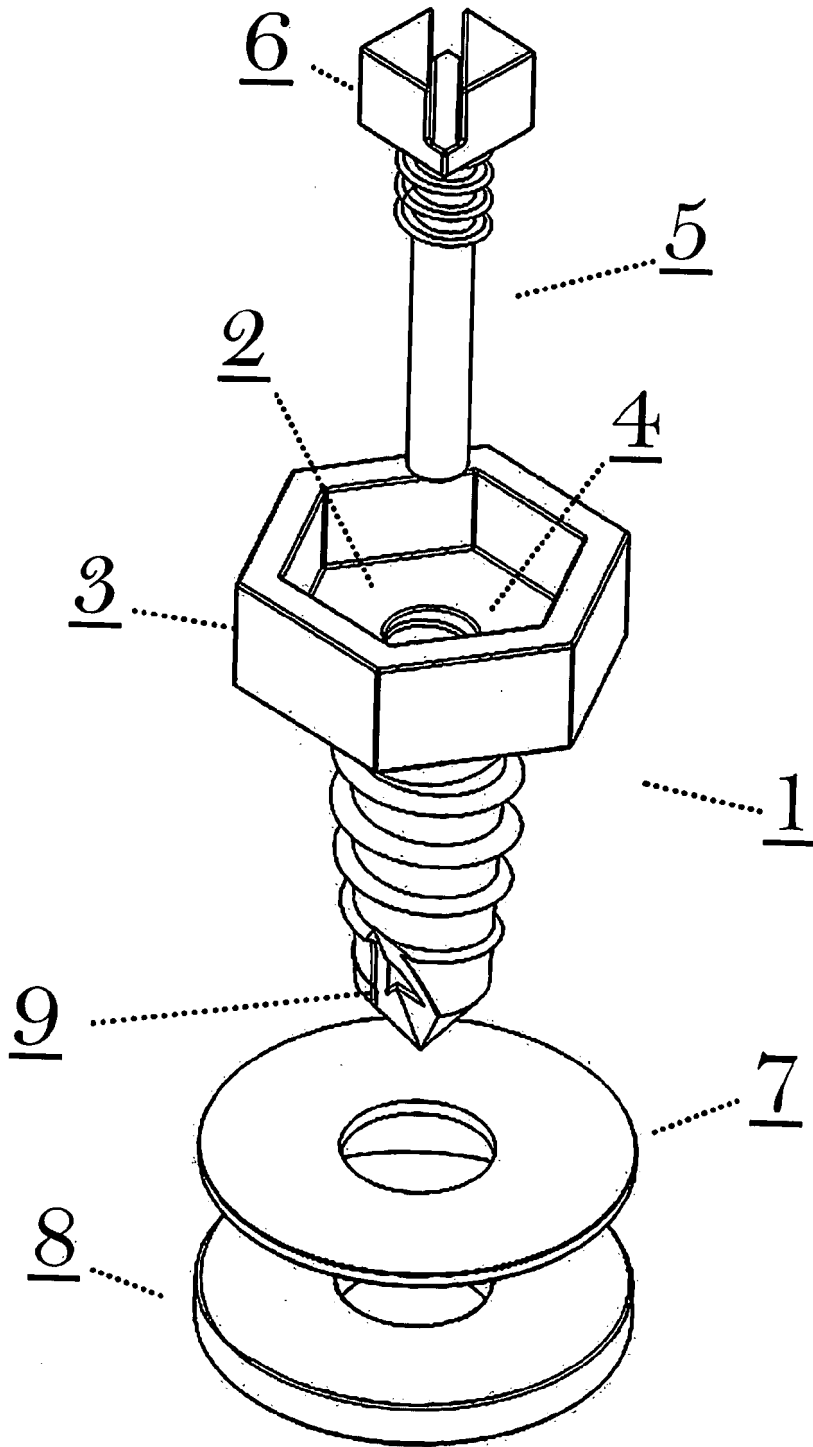


FIGURE 2

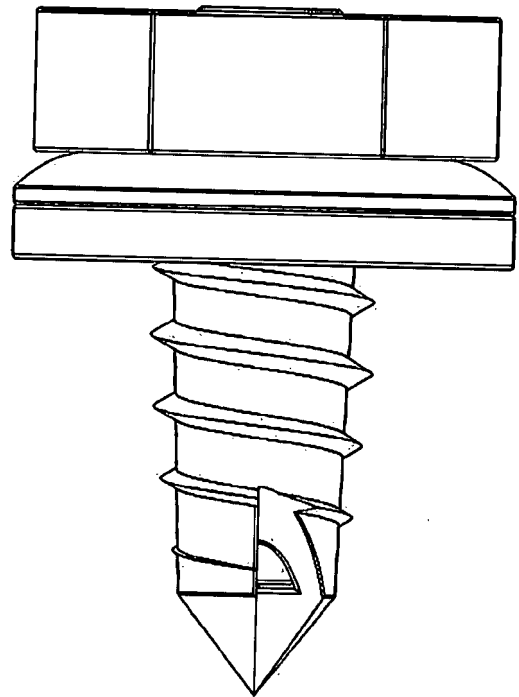
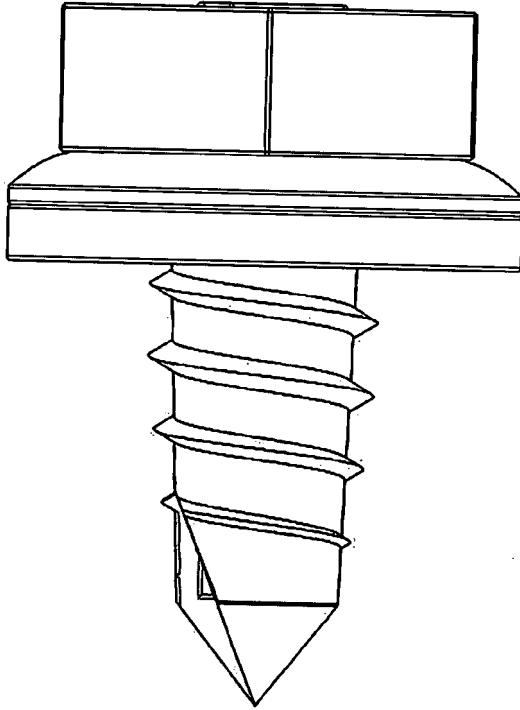


FIGURE 3

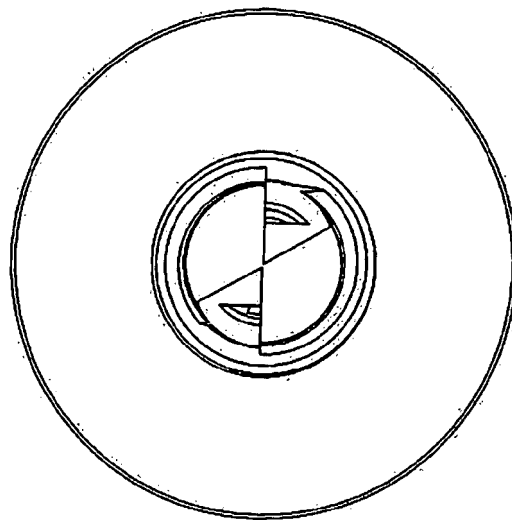
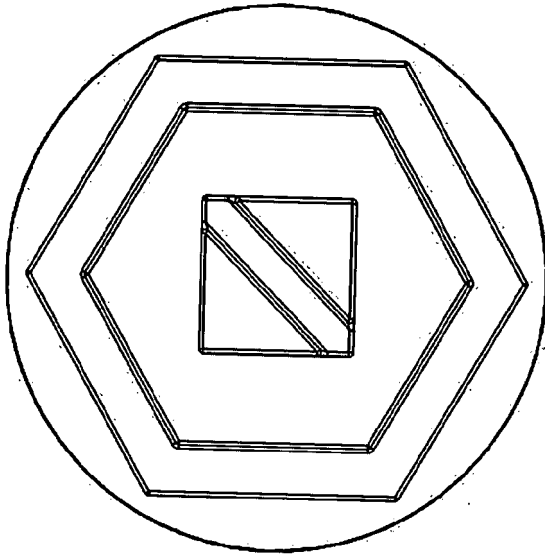
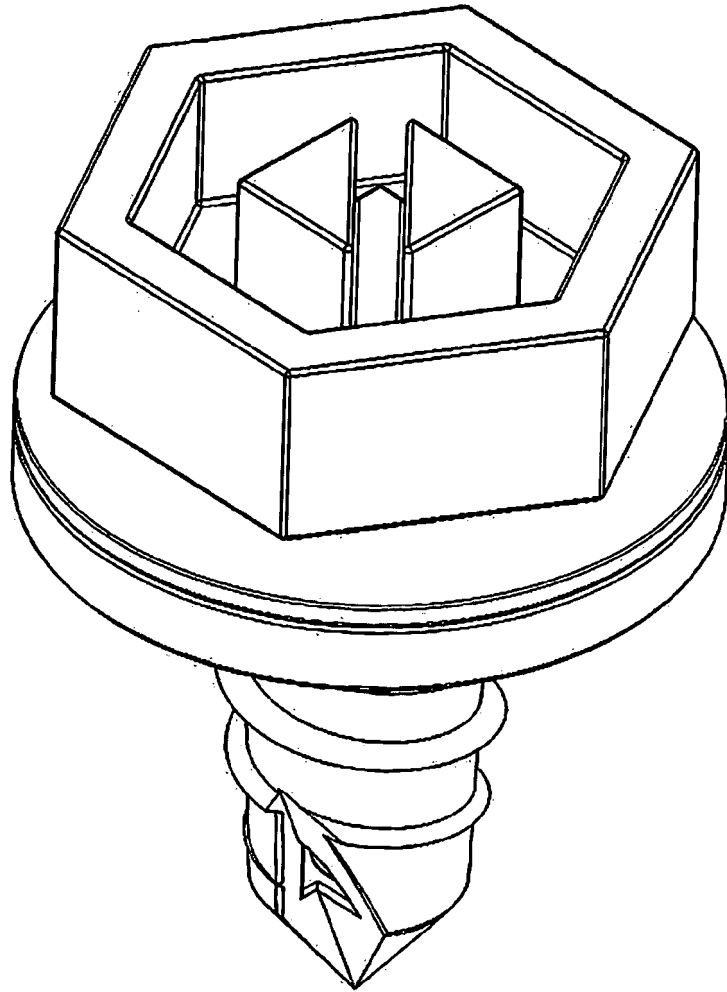


FIGURE 4



AN AFTERMARKET FLUID RELEASE VALVE

Field of the Invention

- 5 The present invention relates to an aftermarket fluid release valve, more particularly but not exclusively to a release valve for the release of fluid from a closed system.

Background

- 10 Central heating systems are commonplace in many homes, or more particularly sealed water-heating circuits are included as space heating.

It is recommended that such fluid based central heating systems are regularly bled to remove any air pockets that have developed through and may affect the efficiency of
15 the heating system.

This process is traditionally carried out by use of a bleed valve on the radiator that enables the controlled released of air from the closed system. However if this valve breaks or becomes damaged, for example wherein the thread rusts out, or the head
20 is turned through repeated use, the valve cannot be used until a replacement is fitted. Which may take time and expense, meanwhile compromising the efficiency of the central heating system.

Also the positioning of a traditional bleed valve is often limited to an end of a radiator,
25 and may not be easily accessible when a radiator is fitted in certain locations and in homes or premises with minimal space.

The present invention arose to overcome the problems associated with broken bleed valves by establishing an easily fitted alternative valve.
30

Prior Art

Accordingly a number of patent applications have been filed in an attempt to resolve the problem or similar, including the following:
35

United Kingdom patent application GB 2 464 835 (HESTER) discloses a bleed valve comprising a housing defining a hollow interior region, a coupling means extending from the housing and adapted for releasably coupling to a device an interior portion of which is to be bled, a communicating bore extending through the coupling means
5 for accommodating fluid bled from the interior portion of the device, the communicating bore extending from a valve seat within the hollow interior region, a valving means located in the hollow interior region of the housing, the valving means being alternately operable in an isolating state co-operating with the valve seat for sealably closing the communicating bore, and in a bleed state permitting flow of fluid
10 through the communicating bore to the hollow interior region between the valving means and the valve seat for facilitating bleeding of the interior portion of the device, and an outlet port from the hollow interior region for accommodating fluid therefrom.

Granted United Kingdom patent GB 2 436 687 (RICK) discloses a vent pin and plug
15 assembly for venting air from a central heating radiator characterised in that a free end portion of the vent pin has a retaining thread and a section of this end retaining thread is cut away such that, in use, air is released from the radiator past the pin if the pin is partly unscrewed without the vent pin losing contact with the plug, the vent pin has a safety feature consisting of an end stop that is an integral part of the pin
20 and as such avoids the possibility of a separately assembled stop becoming loose and falling into the radiator

In contrast the present invention provides a convenient, safe and simple means to prolong life of radiators and allow access to interiors of hollow structures as required.
25

Summary of the Invention

According to the present invention there is provided an aftermarket fluid release valve for a hollow structure, comprising a plug having at least one through-release
30 aperture, a puncture mechanism, and an attachment means to connect the valve to the structure such that inward entrance or progression of the plug towards the structure is enabled, and outward progression inhibited.

Typically the plug has a hollow centre or at least one aperture which may include and
35 allow fluid through-release, or release of fluid through the plug, or the plug's body, and/or bleed of fluid through the centre.

This is typically facilitated through the centre, which centre or lacuna is typically or mainly coaxial to the plug or plug body. In some embodiments the through-release is through a plurality of apertures about or through the body, which may combine with the centre or in other embodiments are separate to the hollow centre.

Advantageously in preferred embodiments the plug includes a combined puncture mechanism and attachment means comprising such as a limited, particular or partial screwthread.

In other embodiments the puncture mechanism may be impelled and the impelling or attachment means may be a sprung or displaceable part or section of the plug's body which acts to impel the plug into the structure.

In preferred embodiments the combined puncture mechanism and attachment means includes a collar and at least one washer, wherein the structure provides or accepts a progressive insertion onto or into the structure and the washer may be a sprung split washer, or other intermediate stage between the structure and plug in use.

The puncture mechanism is progressive wherein ideally inward entrance or progression of the plug towards the structure is enabled in intermediate steps or smoothly, and such as into a hole, and outward progression from the structure or hole is inhibited or in some embodiments prohibited, including by such as a lock mechanism.

In preferred embodiments the air release valve is for use on a hot water, convection or heating radiator, so as to allow such a radiator or similar to be bled independently of any existing or integral bleed valve, in a controlled manner.

Preferably the plug is threaded so that it may be removably or returnably inserted into the radiator's wall, most preferably through a pre-drilled hole, wherein the plug has a screwthread on an external face of the body that engages with the hole's side progressively. Such embodiments advantageously have screw threading that is rigid and better able to withstand outward forces.

35

For example the screwthread may be asymmetric, partial and consist of plural separate triangular projections with outermost faces tending towards orthogonal to the plug body.

5 Some other embodiments may include a plug that includes an expanding or splay arrangement, profile or body, for example wherein the plug may be inserted into the hole and expanded, during or after insertion and so as to limit or inhibit return movement, wherein such movement may be encouraged for example by pressure internal to the radiator.

10

In addition or the alternative the plug may be in form of a column with projections that may be tapped/hammered in to a pre-drilled hole.

15 Typically the plug is formed of a strong durable, heat stable material such as metal or synthetic plastic, and the collar is a projection or moulded, cast or turned ring which prevents movement of the plug when insertion is complete. In some embodiments the collar may be a separate material and/or part.

20 Ideally at least one washer is provided or required when fitting the plug. Most preferably two washers are used when fitting the plug, wherein a first rubber washer is adjacent to the radiator so as to limit damage to the radiator surface. Preferably a second metal washer is set on top of the rubber washer so that it butts up to the plug to provide additional strength where the plug is inserted, enabling a secure fitting to be made.

25

Typically the plug has a distal head that is shaped so as to enable the plug to be turned or screwed into place, also allowing access to the centre. Preferably therefore the head comprises an annular ring or toroid that may be tightened and loosened by use of a spanner or socket or other tool, and describing or surrounding the centre.

30

In addition or the alternative the head may be adapted to accept tightening and loosening by a hex head, an Allan key or screw driver.

35 According to a second aspect of the present invention the plug has a centre arranged so as to be able to accept a release screw and to provide an exit point for air or fluid.

In preferred embodiments the release screw is a self-tapping screw that can be screwed into the centre and in screwing will close or open apertures.

5 In other embodiments the centre is threaded so as to allow the manual release screw to be inserted to a predefined channel.

In preferred embodiments the plug body includes at least one aperture so as to allow, in use, passage of liquid or gases through the plug body to the centre.

10 Typically the release screw may only be partially threaded so as to further facilitate the opening and closing of the apertures wherein the screw tip is unthreaded and does not touch the plug body inner face.

15 In the preferred embodiment as the release screw is inserted the channel is cut by the thread of the self-tapping release screw into the plug's body inner. Typically the thread of the release screw connects with the plug body but the main screw shaft does not meaning there is a small gap between the shaft and the plug body allowing air to circulate.

20 The channel cut by the screw is the route by which air is released when the aperture is open. When the apertures are aligned with the channel, flow of air is enabled as the air can escape out through the centre by passing along the channel.

25 In the example of the radiator, pressurised air from within the radiator would pass through the aperture in the plug body to the centre, exiting through the channel of the release screw.

30 Typically the insertion of the release screw controls the opening and closing of the aperture/s wherein as the release screw is undone the apertures open and when it is tightened the apertures close.

In some embodiments the release screw may have a tether or lock to the plug body to prevent the release screw being expelled as and when pressurised fluid is released.

35

Preferably the air release valve is fitted to a radiator's upper section, above fluid level so as to allow the release of air as required. In some further embodiments the release valve may be fitted at a radiator base so as to allow drainage of water or fluid from the radiator or other fluid storage solution.

5

Brief Description of Figures

Figure 1 shows an isometric view of a preferred embodiment of the release valve;

10 Figures 2 show side views of the embodiment of Figure 1;

Figures 3 show end views of the embodiment of Figure 1;

And

15

Figure 4 shows an isometric view of the embodiment of Figure 1 intact.

Detailed Description of Figures

20 The pictured embodiment includes the following:

Plug 1

Plug body 2

25

Plug ring 3

Centre 4

30 Screw 5

Head 6

First washer 7

35

Second washer 8

Aperture 9

5 Before installation, a user will wait until the heating system has cooled down sufficiently to be safe and install the release valve into a wall of the radiator either by using a drill and socket or a manual spanner. As shown in figure 1, the valve comprises a plug 1 having a through-release aperture 9. The plug 1 the plug includes a combined puncture mechanism and attachment means a screwthread.

10 The plug 1 has a centre 4 arranged so as to be able to accept a release screw 5 and to provide an exit point for air or fluid from the radiator (not shown). The centre 4 is threaded so as to allow the manual release screw 5 to be inserted to a predefined channel. The release screw 5 is only partially threaded so as to further facilitate the opening and closing of the apertures wherein the screw tip is unthreaded and does
15 not touch the plug body 2 inner face.

The plug body 2 includes an aperture 9 so as to allow, in use, passage of liquid or gases through the plug body 2 to the centre 4.
20

Air from inside the radiator will travel through the aperture and through the centre.

25 Trapped air will then be released in a safe and effective way.

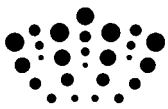
The invention has been described by way of examples only and it will be appreciated that variation may be made to the above-mentioned embodiments without departing from the scope of invention.

30 With respect to the above description then, it is to be realised that the optimum dimensional relationships for the parts of the invention, to include variations in size, materials, shape, form, function and manner of operation, assembly and use, are deemed readily apparent and obvious to one skilled in the art, and all equivalent relationships to those illustrated in the drawings and described in the specification
35 are intended to be encompassed by the present invention.

Therefore, the foregoing is considered as illustrative only of the principles of the invention. Further, since numerous modifications and changes will readily occur to those skilled in the art, it is not desired to limit the invention to the exact construction and operation shown and described, and accordingly, all suitable modifications and
5 equivalents may be resorted to, falling within the scope of the invention.

Claims

- 5 1. An aftermarket fluid release valve for a hollow structure, comprising a plug having at least one through-release aperture, a puncture mechanism, and an attachment means to connect the valve to the structure such that inward entrance or progression of the plug towards the structure is enabled and outward progression inhibited.
- 10 2. An aftermarket fluid release valve according to claim 1 wherein the plug has a centre arranged so as to be able to accept a release screw and to provide an exit point for fluid from the structure.
- 15 3. An aftermarket fluid release valve according to claims 1 or 2 wherein the plug includes a combined puncture mechanism and attachment means.
4. A method of providing a release valve for a radiator comprising installing a valve as claimed in any preceding claim or according to the figures to a radiator.



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Examiner: Vaughan Phillips

Claims searched: 1-4

Date of search: 15 October 2012

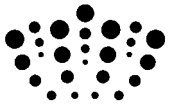
Patents Act 1977: Search Report under Section 17

Documents considered to be relevant:

Category	Relevant to claims	Identity of document and passage or figure of particular relevance
X	1-4	GB 2432405 A (WESTACOTT) see abstract
X	1-4	US 7150476 B2 (BLAZING) see abstract
X	1-4	US 5694972 A (TOM KING) see abstract
X	1-4	US 5105844 A (KING) see abstract
X	1-4	US 3162211 A (BARUSCH) see whole document
X	1-4	US 105818 A (LORD) see whole document
A	-	GB 2436687 A (RICK) see abstract
A	-	EP 0218409 A2 (MOUTRIE) see abstract
A	-	CH 641885 A5 (KELLER) see WPI abstract accession no. 1984-095088[16]

Categories:

X	Document indicating lack of novelty or inventive step	A	Document indicating technological background and/or state of the art.
Y	Document indicating lack of inventive step if combined with one or more other documents of same category.	P	Document published on or after the declared priority date but before the filing date of this invention.
&	Member of the same patent family	E	Patent document published on or after, but with priority date earlier than, the filing date of this application.



Field of Search:

Search of GB, EP, WO & US patent documents classified in the following areas of the UKC^X :

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Worldwide search of patent documents classified in the following areas of the IPC

F16K; F16L; F24D

The following online and other databases have been used in the preparation of this search report

Online: WPI, EPODOC

International Classification:

Subclass	Subgroup	Valid From
F16K	0024/04	01/01/2006
F24D	0019/08	01/01/2006